

IN THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

Claim 1 (currently amended): A method of forming ceramic capillary ribs, comprising the steps of:

forming a ceramic paste film by coating a ceramic paste on ~~[the]~~ a surface of a substrate; and

moving one of a blade and said substrate in a predetermined direction in a state in which comb-teeth formed on at least a part of said blade are thrust into said paste film, thereby forming ceramic capillary ribs on the surface of said substrate.

Claim 2 (original): A method of forming ceramic capillary ribs, comprising the steps of:

forming a ceramic paste film by coating a ceramic paste on a surface of a substrate; and

moving one of a blade and said substrate in a predetermined direction in a state in which comb-teeth formed on at least a part of said blade are thrust into said paste film, thereby forming a ceramic capillary layer on the surface of said substrate and ceramic capillary ribs on said ceramic capillary layer.

Claims 3-10 (canceled)

Claim 11 (original): An apparatus for forming ceramic capillary ribs, comprising:

a base horizontally supporting the substrate;

a moving head horizontally movably positioned above said base;

a blade holder attached to said moving head;

a blade held by said holder at a position opposite said substrate and at right angles to a direction of moving of said moving head, wherein a lower part of the blade includes comb-teeth held horizontally; and

an actuator causing said moving head to move horizontally;

wherein a ceramic capillary rib is formed on a surface of said substrate by horizontally moving said blade by thrusting said comb-teeth into the ceramic paste film formed on the surface of said substrate.

Claim 12 (original): An apparatus for forming ceramic capillary ribs according to claim 11, wherein said blade holder is vertically movably attached to the moving head via holder depressing means which pushes down said blade holder so that the lower ends of the comb-teeth are in contact with the substrate under a predetermined pressure.

Claim 13 (currently amended): An apparatus for forming ceramic capillary ribs according to claim 12, wherein a pair of holder depressing means are provided on the moving head at ~~one of a position[s]~~ one of a position corresponding to ~~[the both] opposite opposite~~ ends of the blade ~~[or to] and a position[s] [near the both] in proximity with said opposite and~~ a position in proximity with said opposite ends.

Claim 14 (original): An apparatus for forming ceramic capillary ribs according to claim 11, wherein:

said blade holder is vertically movably attached to the moving head via blade adjusting means for adjusting the vertical position of the lower ends of the comb-teeth;

said moving head is provided with position sensors for detecting one of a displacement of the substrate surface relative to a reference position of the substrate surface, and a displacement of the ceramic paste film surface relative to a reference position of the ceramic paste film surface; and

wherein a controller is provided for controlling said blade adjusting means by the use of the detection output of said position sensors.

Claim 15 (original): An apparatus for forming ceramic capillary ribs according to claim 14, wherein a pair of blade adjusting means are provided on the moving head at positions corresponding to one of opposite ends of the blade and positions in proximity with each of said ends.

Claim 16 (currently amended): An apparatus for forming ceramic capillary ribs according to ~~claims~~ claim 14 [[or 15]], wherein said position sensor detects one of a displacement of the substrate surface and a displacement of the ceramic paste film ahead of the blade in the moving direction.

Claim 17 (currently amended): An apparatus for forming ceramic capillary ribs according to ~~claims~~ claim 14 [[or 15]], wherein said position sensor detects one of a displacement of the substrate surface and a displacement of the ceramic paste film directly below the blade in a longitudinal direction.

Claim 18 (original): A ceramic capillary rib formed by the use of the forming apparatus according to claim 11.

Claim 19 (original): An apparatus for forming ceramic capillary ribs, comprising:

- a base having a carriage horizontally supporting a substrate;
- a fixed head positioned above said carriage;
- a blade holder attached to said fixed head; and a blade held by said blade holder, opposite to said substrate and at right angles to a moving direction of said carriage, wherein a lower part of the blade includes comb-teeth directed horizontally; and

wherein said carriage is horizontally movable with said comb-teeth thrust into the ceramic paste film formed on the surface of said substrate, thereby forming ceramic capillary ribs on the surface of said substrate.

Claim 20 (original): An apparatus for forming ceramic capillary ribs according to claim 19, wherein said blade holder is vertically movably attached to the fixed head via holder depressing means which pushes down said blade holder so that the lower ends of the comb-teeth are in contact with the substrate under a predetermined pressure.

Claim 21 (original): An apparatus for forming ceramic capillary ribs according to claim 20, wherein a pair of holder depressing means are provided on the fixed head at positions corresponding to one of opposite ends of the blade and positions in proximity with said ends.

Claim 22 (original): An apparatus for forming ceramic capillary ribs according to claim 19, wherein:

said blade holder is vertically movably attached onto the fixed head via blade adjusting means for adjusting a vertical position of lower ends of the comb-teeth;

said fixed head is provided with position sensors for detecting one of a displacement of the substrate surface relative to a reference position of the substrate surface and a displacement of the ceramic paste film surface relative to a reference position of the ceramic paste film surface; and

a controller is provided for controlling said blade adjusting means by the use of the detection output of said position sensors.

Claim 23 (currently amended): An apparatus for forming ceramic capillary ribs according to claim 22, wherein a pair of blade adjusting means are provided on the fixed head at one of positions corresponding to the opposite ends of the blade and positions in proximity with said ends.

Claim 24 (currently amended): An apparatus for forming ceramic capillary ribs according to ~~claims~~ claim 21 [[or 22]], wherein said position sensor detects one of said a displacement of the substrate surface and said displacement of the ceramic paste film ahead of the blade in the moving direction of the blade relative to the carriage serving as a reference.

Claim 25 (currently amended): An apparatus for forming ceramic capillary ribs according to ~~claims~~ claim 22 [[or 23]], wherein said position sensor detects one of said displacement of the substrate surface and said displacement of the ceramic paste film directly below the blade in the longitudinal direction.

Claim 26 (original): A ceramic capillary rib formed by to use of the forming apparatus according to claim 19.

Claim 27 (currently amended): A blade having comb-teeth formed on an edge thereof, used in the method for forming a ceramic capillary rib according to ~~claims~~ claim 1 [[or 2]].

Claim 28 (original): A blade according to claim 27, wherein said blade has a thickness (t) within a range of from 0.01 to 3.0 mm, and when the comb-teeth have a pitch P, the gap between the comb-teeth is W, and the gap has a depth h, these parameters are in relationship of $0.03 \text{ mm} \leq h \leq 1.0 \text{ mm}$ and $W/P \leq 5-0.9$.

Claim 29 (original): A blade according to claim 27, wherein the gaps of the comb-teeth comprise one of rectangular shaped gaps, trapezoidally shaped gaps, and inverted trapezoidally shaped gaps.

Claim 30 (currently amended): A ceramic rib formed on a substrate, wherein: when the height of said rib is H, the width of the rib at a height of $1/2 H$ is W_c , the width of the rib at a height of $3/4 H$ is W_M , and the width of the rib at a height of $9/10 H$ is W_T ,

the dispersion of each of H , W_c , W_M and W_T as expressed as (maximum or minimum value - average value)/average value is up to 5%, and the aspect ratio as expressed as H/W_c is within a range of from 1.5 to 10.

Claim 31 (original): A ceramic rib formed on an insulating layer formed on a substrate, wherein:

when the height of said rib is H , the width of the rib at a height of $1/2H$ is W_c , the width of the rib at a height of $3/4H$ is W_M , and the width of the rib at a height of $9/10 H$ is W_T ,

the dispersion of each of H , W_c , W_M and W_T as expressed as (maximum or minimum value - average value)/average value is up to 5%, and the aspect ratio as expressed as H/W_c is within a range of from 1.5 to 10.

Claim 32 (original): An FPD having ceramic ribs prepared by firing ceramic capillary ribs formed by the method according to claim 1.

Claim 33 (original): An FPD having ceramic ribs formed on an insulating layer prepared by firing a ceramic capillary layer and ceramic capillary ribs formed by the method according to claim 2.

Claim 34 (original): A PDP which comprises a plurality of address electrodes formed in a plurality of rows re formed at prescribed intervals on a substrate, and plurality of ceramic ribs formed between said address electrodes in the plurality of rows, wherein:

an insulating layer covering said address electrodes is formed integrally with said ceramic rib on the substrate, and the insulating layer on the upper surface of said address electrodes has a thickness within a range of from 0 to $20\mu\text{m}$.

Claim 35 (original): A manufacturing method of PDP, comprising:

forming a plurality of rows of address electrodes at prescribed intervals on a substrate;

forming a ceramic paste film by coating a ceramic paste with a prescribed thickness

on the surface of said substrate so as to cover said plurality of rows of address electrodes;

forming a plurality of ceramic capillary ribs between said plurality of rows of address electrodes and forming a ceramic capillary layer covering said address electrodes by moving one of a blade and said substrate in a predetermined direction in a state in which comb-teeth formed along the edge of the blade are thrust into said paste film; and

integrally forming an insulating layer covering said ceramic ribs and said address electrodes on said substrate by drying and then firing said ceramic capillary ribs and said ceramic capillary layer such that the insulating layer on the upper surface of said address electrodes has a thickness within a range of from 0 to 20 μ m.

Claim 36 (original): An apparatus for forming ceramic capillary ribs according to claim 11, wherein said blade holder is vertically movably attached to the moving head via a holder depressing mechanism which pushes down the blade holder so that the lower ends of the comb-teeth are in contact with a substrate under a predetermined pressure.

Claim 37 (original): An apparatus for forming ceramic capillary ribs according to claim 36, wherein a pair of holder depressing mechanisms are provided on the moving head at one of a position corresponding to opposite ends of the blade and a position in proximity with said opposite ends.

Claim 38 (original): An apparatus forming ceramic capillary ribs according to claim 11, wherein said blade holder is vertically movably attached to the moving head via a blade adjusting mechanism adjusting the vertical position of the lower ends of the comb-teeth;

said moving head is provided with position sensors detecting one of a displacement of the substrate surface relative to a reference position of the substrate surface and a displacement of the ceramic paste film surface relative to a reference position of the ceramic paste film surface; and

wherein a controller is provided for controlling said blade adjusting mechanism by use of the detection output of said position sensors.

Claim 39 (original): An apparatus for forming ceramic capillary ribs according to claim 38, wherein a pair of blade adjusting mechanisms are provided on the moving head at positions corresponding to one of opposite ends of the blade and positions in proximity with each of said ends.

Claim 40 (currently amended): An apparatus for forming ceramic capillary ribs according to ~~claims~~ claim 38 [[or 39]], wherein said position sensor detects one of a displacement of the substrate surface and a displacement of the ceramic paste film ahead of the blade in the moving direction.

Claim 41 (currently amended): An apparatus for forming ceramic capillary ribs according to ~~claims~~ claim 38 [[or 39]], wherein said position sensor detects one of a displacement of the substrate surface and a displacement of the ceramic paste film directly below the blade in a longitudinal direction.

Claim 42 (original): An apparatus for forming ceramic capillary ribs according to claim 19, wherein said blade holder is vertically movably attached to the fixed heads via a holder depressing mechanism which pushes down said blade holder so that the lower ends of the comb-teeth are in contact with a substrate under a predetermined pressure.

Claim 43 (original): An apparatus for forming ceramic capillary ribs according to claim 42, wherein a pair of holder depressing mechanisms are provided on the fixed head at positions corresponding to one of both ends of the blade and a position in proximity with said ends.

Claim 44 (original): An apparatus for forming ceramic capillary ribs according to claim 19, wherein:

said blade holder is vertically movably attached onto the fixed head via a blade adjusting mechanism adjusting a vertical position of lower ends of the comb-teeth;

said fixed head is provided with position sensors detecting one of a displacement of the substrate surface relative to a reference position of the substrate surface and a displacement of the ceramic paste film surface relative to a reference position of the ceramic paste film surface; and

a controller is provided controlling said blade adjusting mechanism by the use of the detection output of said position sensors.

Claim 45 (original): An apparatus for forming ceramic capillary ribs according to claim 44, wherein a pair of blade adjusting mechanisms are provided on the fixed head at one of positions corresponding to opposite ends of the blade at positions in proximity with said ends.

Claim 46 (currently amended): An apparatus for forming ceramic capillary ribs according to ~~claims~~ claim 43 [[or 44]], wherein said position sensor detects one of a displacement of the substrate surface and a displacement of the ceramic paste film ahead of the blade in the moving direction of the blade relative to the carriage serving as a reference.

Claim 47 (currently amended): An apparatus for forming ceramic capillary ribs according to ~~claims~~ claim 44 [[or 45]], wherein said position sensor detects one of said displacement of the substrate surface and said displacement of the ceramic paste film directly below the blade in the longitudinal direction.

Claim 48 (new): An apparatus for forming ceramic capillary ribs according to claim 22, wherein said position sensor detects one of said a displacement of the substrate surface and said displacement of the ceramic paste film ahead of the blade in the moving direction of the blade relative to the carriage serving as a reference.

Claim 49 (new): A blade having comb-teeth formed on an edge thereof, used in the method for forming a ceramic capillary rib according to claim 2.

Claim 50 (new): An apparatus for forming ceramic capillary ribs according to claim 44, wherein said position sensor detects one of a displacement of the substrate surface and a displacement of the ceramic paste film ahead of the blade in the moving direction of the blade relative to the carriage serving as a reference.